

REMARKS

In response to the Office Action mailed May 12, 2005, Applicant submits the following remarks.

Status of the Claims

Claims 1-13 were previously cancelled.

Claims 14-29 are currently pending and rejected to in the present Office Action.

Claim 14 has been amended to clarify the invention claimed by Applicant. Further, the amendments made to claim 14 are supported by the originally filed Specification as disclosed in paragraphs [0004] - [0006], and [0013]. No new matter has been added.

Claim 27 has been amended to fix an informality and to make the claim consistent with the originally filed Specification as disclosed in paragraph [0024]. No new matter has been added.

Claim 30 has been added to clarify the originally disclosed invention. This claim is supported in originally filed Figs. 1-3. No new matter has been added.

Objection Of Claim 27

On page 2 of the Office Action mailed May 12, 2005, the Patent Office objected to claim 27 because of an informality cited by the Examiner on page 2 of the Office Action mailed May 12, 2005. Claim 27 has been amended to fix the informality cited by the Examiner and to make the claim consistent with the originally filed Specification as disclosed in paragraph [0024]. No new matter has been added.

Rejection Of Claims 14-29 under 35 U.S.C § 103

On page 2 of the Office Action mailed May 12, 2005, the Patent Office rejected claims 14-24 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0070003 to Gaska (hereinafter "Gaska") in view of U.S. Patent No. 6,802,902 to Beaumont et al. (hereinafter "Beaumont").

Additionally, on page 4 of the Office Action mailed May 12, 2005, the Patent Office rejected claims 25-29 under 35 U.S.C. § 103(a) as being unpatentable over Gaska in view of

Beaumont and further in view of U.S. Patent No. 5,698,870 to Nakano et al. (hereinafter "Nakano").

Independent Claim 14

Applicant has amended independent claim 14 and includes the following remarks to clarify the distinctions between the invention and the prior art cited by the Patent Office.

Although Beaumont does disclose depositing a silicon-type (hereinafter "SiN-type") layer on a thin GaN epilayer while in an associated growth chamber, the method of depositing the SiN-type layer of this reference teaches away from the Applicant's claimed invention for two reasons.

First, the SiN-type layer of Beaumont is deposited as an intermediate layer of the overall GaN structure. (Fig. 1; Col. 5, lines 40-60). As disclosed in Beaumont, the SiN-type layer is deposited on a first thin layer of GaN (layer 2 of Fig. 3) before a subsequent regrowth of the GaN is carried out on the SiN-type layer. Further, the SiN-type layer is deposited and etched with varying growth area (W_{BO} in Fig. 3) breaks to allow subsequent regrowth of the GaN structure. (Column 3, lines 7-22). The subsequent regrowth causes the GaN to grow laterally out from the growth area (W_{BO}) creating a trapezoidal-like structure. Fig. 3 shows a start of this process around a single isolated growth area (W_{BO}), while Fig. 6 shows this process at a stage further along in the GaN regrowth process. Further, the regrowth of the GaN takes place until these trapezoidal structures coalesce to form a continuous top layer of GaN. (Col. 2, lines 54-68; Col. 5, lines 25-32). Most notably, the formation of the continuous GaN layer formed above the SiN-type layer then serves as a GaN substrate for the subsequent deposition of a device structure, such as a diode laser structure. (Col. 7, line 65- col. 8, line 5). In this manner, an active device, such as the diode laser structure, is formed in the upper continuous GaN layer above the SiN-type layer. This differs from what is claimed in Applicant's application, where the active devices are formed in the GaN layers below the top SiN-type passivation layer. Therefore, the SiN-type layer disclosed by Beaumont is deposited as an intermediate layer below (layer 3 shown in Fig. 1 and 3) the overall GaN substrate and cannot be a top layer as disclosed and claimed in Applicant's application.

Second, the purpose of depositing the SiN-type layer in Beaumont differs from that of Applicant's invention. Beaumont uses the deposition of the SiN-type layer in order to grow the

GaN epitaxial layers on top of the SiN-type layer for formation of the active devices. (Col. 7, line 65- col. 8, line 5). Applicant's invention, on the other hand, uses the deposition of the SiN-type layer as a top layer of the GaN structure to passivate surface traps on the surface of the GaN epitaxial layers in which active devices are formed. (Paragraph [0014]).

Similar to that of Applicant's application, Gaska shows the deposition of a SiN-type layer as the passivation layer on top of the semiconductor structure. (Figures 10-11; paragraph 36). Since there is no mention in Beaumont of depositing the SiN-type layer as a top passivation layer of the GaN structural epitaxial layers, there is no suggestion or motivation to combine Beaumont with Gaska. Therefore, the deposition process in Beaumont also teaches away from the claimed invention of Gaska and the proposed modification would change the principle operation of both references. Thus, Beaumont cannot be combined with Gaska for at least this reason.

Thus, Beaumont teaches away from what is claimed in both Applicant's application and the Gaska reference. Since, Beaumont teaches away from these references, it cannot be used as a reference in rejection of Applicant's claims and is thus removed from the pool of applicable prior art references. Since Beaumont is no longer a valid reference, the rejection of claim 14 no longer stands for at least this reason. In light of the amendments made to claim 14 and above arguments, Applicant respectfully requests reconsideration of claim 14.

Dependent Claims 15-29

The Patent Office has also rejected claims 15-29 under 35 U.S.C. 103(a) using Beaumont as a reference. Claims 15-29 depend directly or indirectly from amended claim 14. In consideration of the amendments and arguments pertaining to claim 14 above, the rejection of these claims should be removed for this reason alone, because Beaumont is no longer a valid reference.

Further, Gaska and Nakano alone do not teach all the elements claimed in independent claim 14, specifically, depositing a thermally assisted silicon nitride passivation layer as a surface layer "...before the GaN epitaxial structure is removed from an associated growth chamber." Therefore claims 15-29, which depend directly or indirectly from claim 14 are allowable for this reason.

Applicant respectfully requests reconsideration of claims 15-29. Applicant reserves the right to make future arguments for the distinct patentability of these claims pertaining to these references.

In view of the discussion above, claims 14-29 are allowable. Reconsideration is respectfully requested. If any issues remain, the examiner is encouraged to contact the undersigned attorney of record to expedite allowance and issue.

Respectfully submitted,

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